WHAT IS CLAIMED IS:

1. - 9.   (canceled)

10.   (new) A method for automatic identification of microorganisms collected on a carrier, which microorganisms are fungal spores and bacteria and are airborne or present in water, the method comprising the steps of:

a)   recording at least one color image of a carrier surface with collected microorganisms;

b)   digitalizing the at least one color image to a digitalized color image;

c)   converting the digitalized color image into a grayscale image and optionally converting subsequently the grayscale image into a silhouette image, wherein, when microorganisms are present, an image is produced with resulting full-surface labeled objects of a first grayscale and a background of a different second grayscale;

d)   identifying objects as identified objects in the grayscale image and/or in the silhouette image by a model-based comparative method;

e)   marking contours of the identified objects in the color image and/or in the grayscale image;

f)   determining at least one feature of the identified objects in the color image and/or in the grayscale image;

g)   classifying case-by-case the identified objects based on the at least one feature as classified objects;

h)   indicating and/or saving the classified objects as species and/or name and/or code; and

i)   indicating and/or saving at least one non-classified, unidentified object, if present, as a color image and/or grayscale image and/or silhouette image wherein at least one non-classified, unidentified object is subsequently discarded or added as a new case with determined class in the classification system.

11.   (new) The method according to claim 10, wherein, after the step of classifying case-by-case, the classified objects are counted to determine a count and indicated and/or saved as species and/or name and/or code together with the count of the classified objects.

12. (new) The method according to claim 10, wherein, after the step of classifying case-by-case, all objects are counted to determine a count and the at least one non-classified object is indicated and/or saved as color image and/or grayscale image and/or silhouette image together with the count of the at least one non-classified object.

13. (new) The method according to claim 10, wherein, after the step of digitalizing, errors are purged from the color image of the carrier surface and the color image is subsequently standardized by image preprocessing.

14. (new) The method according to claim 10, wherein the at least one feature is a shape, a texture or a structure of the identified objects in the color image and/or grayscale image.

15. (new) The method according to claim 10, further comprising the steps of:

performing a first image analysis for separating overlapping microorganisms in the color image or in the grayscale image, wherein the overlapping microorganism as objects are removed from the color image or the grayscale image and saved as a first partial image;

separating with a second image analysis the overlapping objects of the first partial image from one another and saving the separated overlapping objects as second partial images;

identifying the objects that are only partially recorded because of overlap by comparison with saved and identified objects;

indicating and/or saving the original separated object, the determined identified object, and a level of congruence.

16. (new) The method according to claim 10, wherein the color image of the carrier surface is recorded at least once two-dimensionally and/or sterically and/or three-dimensionally.

17. (new) The method according to claim 10, further comprising the step of dying the carrier surface prior to recording the color image of the carrier surface.

18. (new) The method according to claim 10, further comprising the steps of:

dyeing the carrier surface after the step of recording the at least one color image of the carrier surface;

recording at least one additional color image of the dyed carrier surface; and

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digitalized the at least one additional color image, wherein the steps c) to i) are performed for the at least one color image of the carrier surface recorded before the step of dyeing and for the at least one additional image of the dyed carrier surface.